

In re Patent Application of:
BONKOWSKI ET AL.
Serial No. 10/688,357
Filed: October 17, 2003

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REMARKS

Claims 1 to 5 are pending in this application.

Claim 1 is rejected under 35 U.S.C. 102 (b) as being anticipated by Miekka et al. (U.S. patent No. 5,629,068)

In the office action, the Examiner points out that:

Miekka discloses a security article comprising a light transmissive substrate and a color shifting multi-layer optical film (ink layers col. 3 lines 15-17). The light transmissive substrate is said to have a first surface and an opposing second surface, the first surface having a diffraction grating or holographic image. The color shifting multi-layer optical film is said to be formed on the diffraction grating pattern or holographic image such that the film conforms to the shape of the diffraction grating pattern or holographic image pattern. Furthermore, the color shifting multilayer optical film, i.e. ink layers, have an optical effect that is decorative and difficult to duplicate by forgers.

Claim 1 of the instant application defines:

A security article comprising: a light transmissive substrate having a first surface and an opposing second surface, the first surface having a diffraction grating pattern or a holographic image pattern formed thereon; and a color shifting multilayer optical film formed on the diffraction grating pattern or holographic image such that

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said film conforms to the shape of the diffraction grating pattern or holographic image pattern. (emphasis added)

One significant difference between the applicant's invention and that of Miekka's is that the instant invention provides a multilayer film, comprising several thin layers, one over the other, forming layers in the form of a film which covers the holographic structure such that the film, and the layers, conform to the shape of the diffraction grating. The composite layers of the multilayer optical film which conform to the grating or hologram shape provide color shifting with a change of angle or incident light. The result of the structure is that the hologram is formed in each of the multi-layers.

Miekka does not provide such a structure.

With reference to claim 1, the office action indicates that Miekka et al. disclose an article comprising a color shifting multilayer film. In fact, in col. 3, lines 15-17, Miekka et al. disclose printing with a layer of the type one, two or three ink 13. An important distinction between the instant invention and that of Miekka et al. is that they do not provide color shifting "layers".

In contrast to this, Miekka et al. provide a plurality of thin film flakes in a binder which is applied over a holographic structure in a single layer. Miekka et al.'s mixture of flakes in solvent and binder is not a color shifting multi-layer optical film. A film is a thin, covering or coating. A multi-layer film is a film or coating comprised of plural layers. In order to more clearly distinguish from Miekka et al.'s film or single layer coating that includes

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particulate such as platelets or flakes, the applicant has amended claim 1.

Although Miekka et al. teaches providing flakes within solvent and binder coated upon an embossed surface such as a hologram, his resulting device has very poor lacklustre performance.

In the foundation teachings of making such flakes, for example in U.S. patent 5,084,351, the reader is instructed to provide flakes having an aspect ratio at least two to one, and preferably 5-10:1. (Col 16, lines 10-15 of US 5,084,351, a Flex Products, Inc. Patent). Considering this preferred aspect ratio, the pigment size would have to be 5-10 microns or more in order to obtain flakes having a desired high chroma. However, Flakes of such a large size would bridge the grooves of a suitable hologram or diffraction grating and would not conform to the relief pattern. Using an optically variable pigment with flakes less than 5 microns would yield very low chroma as many of the flakes would not lie flat and would end up on their edge or at a low angle. If the flakes were large, they would bridge the gap between adjacent features within the grating, and if the flakes were small having a low chroma, some of the smaller flakes may adhere to the grating contours. However, there would still be binder between the embossing and the flake, otherwise there would be no sticking of the flake to the embossed organic surface; Miekka et al. even point out the binder is necessary to adhere the flakes (Col. 5, line 36-38). Sprinkling the flakes over a heated embossed surface or solvent washing of the embossed surface (to make the embossing sticky), as per Col. 5, lines 35-50, is again a statistical proposition that all valleys, peaks and side walls would be

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completely covered by side by side pigment without pigment overlap and this is not possible. Any binder between the embossed surface and the flake will degrade the image of the hologram, especially if the flakes are not in exact parallel formation to the embossed surface.

Furthermore, the individual flakes could not conform around the peaks and valleys as the optical stack platelets are stiff and statistics would indicate that not all flakes would "leaf" at the peaks and valleys. There would invariably be binder in the valleys and at the peaks. Any binder in the valleys will reduce the depth of the grating causing loss of holographic performance. There is just no physical principal that would allow multi-shaped flakes or even shaped flakes to conform perfectly to the diffractive surface even with the so-called "leafing" effect. "Leafing" is a term applied to platelet pigments aligning at a flat smooth surface to maximize the reflectance effect. In the case of a diffractive embossed surface, the best one could achieve, if in fact one could achieve it, is that only some of the flakes would conform to the diffractive surface which would render the hologram or diffractive effect with much less reflective power than the structure defined within the amended claims where the optically variable thin film layers replicate the entire surface or a substantial portion of the hologram.

In summary, the invention now defined in the amended claims has high replication of the surface and in turn has high fidelity of the hologram/diffractive surface with modified colors due to a combination of diffraction and thin film interference. This is certainly not the case with the structure disclosed by Miekka et al.

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Claims 2-5 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Miekka as applied and further in view of Coombs et al. (U.S. Patent No. 5,214,530)

The Examiner says that Miekka fails to disclose that the multilayer optical film comprises an absorber layer, a dielectric layer and a reflector layer, but that Coombs discloses an optical variable device that has observable color shift at different viewing angles.

The applicant would like to point out that Miekka teaches a device that is far inferior to the applicant's invention, and to the best of the applicant's knowledge, Miekka's invention has not become a commercial success. What Miekka teaches is applying a single layer of ink with binder solvent and flakes to a three dimensional diffractive structure. Miekka does not teach or seem to consider the importance of the flakes conforming to the contours of the hologram. Without considering, at a microscopic level, the interaction between large flakes and a small grating contours, or alternatively, smaller flakes with less chroma and their interaction with binder on the grating contours, one would not be alerted to the inherent problems with such a structure.

Coombs et al, in 5,214,530 never contemplates applying his color shifting coating to a three dimensional grating structure or hologram, and Miekka makes no suggestion of a true multi-layer coating being useful. Miekka only teaches dyes and inks, some of which contain pigments and flakes. There is simply no motivation for one to combine the teachings of Coombs and Miekka. In fact Miekka, having a much later

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date than Coombs makes no suggestion of using Coombs thin film layers to cover and take on the impression of a hologram. Miekka actually leads a reader in a very different direction.

The invention has its genesis in the discovery that Miekka's flakes do not conform to the contours of the grating and that this is problematic. The description in the background of the instant invention makes mention of Miekka and describes the significant improvement over Miekka. The invention is in the discovery of applying an inexpensive layered structure in a manner such that the grating forms into the layers so that the color shifting film carries the hologram. Neither Miekka nor Coombs suggest this and combining Coombs with Miekka would not yield the instant invention. One would have to realize the limitations of Miekka and have an understanding of how the flakes were interposed with the grating. In fact, Coombs makes no mention of holograms or gratings at all. Miekka's flakes within his binder do not conform to the hologram and do not have the pronounced, enhanced visual effect that the instant invention provides.

In one embodiment of this invention, a color shifting holographic structure is provided which yields far superior results to that of Miekka. There is a synergistic effect that is afforded when the color shifting layers have a hologram formed therein. This is not seen in Miekka's structure, and Coombs makes no mention of gratings or holograms. In a preferred embodiment, which is relatively inexpensive to produce and has vibrant features, three layers of different materials, an absorber layer, a dielectric layer and a reflector layer, together produce this enhanced effect.

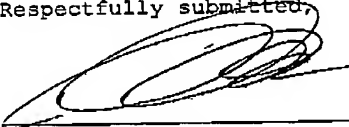
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In summary, in view of the foregoing amendments and remarks, it is respectfully submitted that claims 1-5 are patentable and in condition for allowance. Early and favorable consideration would be appreciated.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Please charge the fee for one additional independent claim and any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 50-1465 and please credit any excess fees to such deposit account.

Respectfully submitted,



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CERTIFICATE OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY that the foregoing correspondence has been forwarded via facsimile number 703-872-9306 to the COMMISSIONER FOR PATENTS, this 14 day of February 2005.

J. Kallmeres

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